

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA 10-27 A

Order Instituting Rulemaking Regarding Policies, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.

Rulemaking 12-11-005 (Filed November 8, 2012)

ASSIGNED COMMISSIONER'S RULING REQUESTING COMMENT ON UPDATING GREENHOUSE GAS EMISSION FACTOR FOR SELF-GENERATION INCENTIVE PROGRAM ELIGIBILITY

Summary

This ruling sets a comment schedule on updates to the calculation of the avoided greenhouse gas emission factor, or factors, that determine eligibility for greenhouse-gas emitting generators and storage technologies to participate in the Self-Generation Incentive Program. Opening comments are due on or before April 17, 2015. Reply comments are due on or before April 23, 2015.

1. Background

On October 11, 2009, Governor Schwarzenegger signed Senate Bill (SB) 412 (Stats. 2009, ch. 182), which extended the Self-Generation Incentive Program (SGIP) until January 1, 2016 and required the Commission to limit eligibility for the program to "distributed energy resources that the commission, in consultation with the State Air Resources Board, determines will achieve

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reductions of greenhouse gas emissions..." SB 412 is codified in, among other code sections, § 379.6.

On September 8, 2011, the Commission adopted Decision (D.) 11-09-015, which, among other things, set a greenhouse gas emissions (GHG) emission rate eligibility threshold of 379 kgCO2/MWh. Fossil-fuel consuming technologies with GHG emission rates above that threshold were not permitted to receive incentives from the program.

On June 20, 2014, Governor Brown signed SB 861 (Stats. 2014 Ch. 35), the Budget Trailer bill, which among its many provisions, modified the SGIP. SB 861 further extended the SGIP from January 1, 2016 to January 1, 2021 and added § 379.6(b)(2), which provides as follows:

On or before July 1, 2015, the commission shall update the factor for avoided greenhouse gas emissions based on the most recent data available to the State Air Resources Board for greenhouse gas emissions from electricity sales in the self-generation incentive program administrators' service areas as well as current estimates of greenhouse gas emissions over the useful life of the distributed energy resource, including consideration of the effects of the California Renewables Portfolio Standard.

This ruling requests parties to file comments on several questions related to the avoided emissions methodology used to establish the GHG eligibility threshold. Following receipt of comments, I intend to issue a proposed decision on this matter.

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¹ Pub. Util. Code § 379.6(b). All statutory references are to the Public Utilities Code, unless otherwise specified.

2. Description of Current Avoided Emissions Methodology

The current methodology used to determine SGIP eligibility was adopted in D.11-09-015 and is described in Section 4.2.9 of the SGIP Handbook.² An in-depth discussion of the methodology can be found in a 2010 staff proposal.³

In the 2010 staff proposal, the assumptions and calculations that are used to derive staff's proposed emission factor can be found in Appendix A to the staff proposal. Staff began with the emission rate used by the California Air Resources Board (ARB) in the 2008 Scoping Plan.⁴ ARB derived a value of 437 kgCO₂/MWh using the weighted average of all natural gas fired generation units in California during the years 2002 to 2004. While it would be appropriate to assume that utility-side of the meter generation primarily or exclusively displaces fossil-fired sources of generation, staff reasoned this approach would not accurately reflect the emissions avoided by self-generation due to the implications of load reduction on the demand for renewable energy under a Renewables Portfolio Standard (RPS) framework. Staff explained:

However, this emissions factor does not necessarily apply when a MWh of electricity is generated by customers using self-generation to offset their own load. The reason for this has to do with the fact that California's Renewables Portfolio Standard (RPS) requires utilities to generate 20% of the electricity required to serve customers with renewable power. When customers generate their own electricity, instead of

² 2015 Self-Generation Incentive Program Handbook, v1. http://www.cpuc.ca.gov/NR/rdonlyres/9E029D5B-3144-4FD4-925E-3B95FE9CAF3C/0/2015SGIPHandbookV1_Final.pdf.

³ The staff proposal was attached to a ruling issued September 30, 2010 in Rulemaking (R.) 10-05-004. The ruling can be found at the Commission's docket card for R.10-05-004. http://docs.cpuc.ca.gov/PublishedDocs/EFILE/RULINGS/124214.PDF.

⁴ http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm.

purchasing that electricity from the utility, customers avoid a mix of gas-fired generation and zero emissions renewable generation that the utility would otherwise have to provide. Changing the emission factor to reflect the 20% RPS yields an electricity emission factor of .349 TonneCO2/MWh, rather than the .437 TonneCO2/MWh value used by ARB.⁵

Estimates of the emissions avoided by new sources of generation may vary widely depending on whether one assumes that the new capacity displaces output from existing sources of generation (the short run or "operating margin" effect), from other new sources of capacity that would have been added but for the generation in question (the long run or "build margin" effect), or from some combination of the two.6 Staff does not explicitly discuss the assumptions regarding the short run versus long run effects underlying the methodology it proposed. However, assuming that SGIP projects displace a combination of fossil-fired and renewable capacity implies a long run effect because, at the time, existing renewable resources were generally not curtailed in response to short run changes in load. Despite the methodology's implicit assumption of a long-term displacement effect, by using the ARB factor as a starting point, it incorporated data from existing plants instead of the estimated emission rates of new combined cycle and simple cycle combustion turbines that might more logically be used to estimate long run avoided emissions.

⁵ September 30, 2010 Staff Proposal filed in R.10-05-004, Appendix A at 57.

⁶ For an overview of these methodologies, see Broekhoff, D. *Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects*. World Resources Institute, 2007. http://www.wri.org/publication/guidelines-quantifying-ghg-reductions-grid-connected-electricity-projects.

In the September 30, 2010 staff proposal, staff proposed an emission factor of 349 kgCO₂/MWh.⁷ The formulas in the staff proposal included an adjustment for avoided line losses, assumed to equal 7.8%.⁸ The Commission adopted staff's proposed emission factor in D.11-09-015, modified to 379 kgCO₂/MWh (349/ (1-0.078)) to simplify the accounting for avoided line losses.⁹

Applying the eligibility threshold to electric-only generation technologies is a straightforward exercise. To establish eligibility, technologies must be tested according to the ASME PTC 50-2002 protocol and must demonstrate that they can generate electricity at an emission rate less than 379 kgCO₂/MWh under realistic operating conditions.¹⁰

For combined heat and power (CHP) applications, the determination is more complicated. D.11-09-015 states that whether CHP technologies reduce GHGs depends on site-specific factors; thus, eligibility for CHP technologies must be assessed on a project-by-project basis. The Commission directed the SGIP program administrators to improve the waste heat utilization worksheets for CHP projects in Tier 2 advice letters. The program administrators filed advice letters, CSE Advice Letter No. 22,12 PG&E Advice Letter No. 3245-G/3923-E, SCE Advice Letter No. 37-E, and SCG Advice Letter No. 4286 on October 10, 2011.

⁷ September 30, 2010 Staff Proposal filed in R.10-05-004, Appendix A at 57.

⁸ September 30, 2010 Staff Proposal, Appendix A at 58 – 61.

⁹ D.11-09-015 at 17.

¹⁰ 2015 SGIP Handbook v1 at 19. http://www.cpuc.ca.gov/NR/rdonlyres/9E029D5B-3144-4FD4-925E-3B95FE9CAF3C/0/2015SGIPHandbookV1_Final.pdf.

¹¹ D.11-09-015 at 70, Ordering Paragraph 2.

¹² CSE is the program administrator for SDG&E.

As currently reflected in the SGIP Handbook,¹³ the methodology for CHP projects uses an avoided boiler fuel methodology.¹⁴ Following this approach, the facility's GHG emission rate is calculated by taking the quotient of the *net* GHG emissions and the electrical output of the facility where the net emissions equal the gross emissions minus the emissions associated with recovered waste heat recovered divided by 80%. This emission reduction represents the fuel that would have otherwise been used to provide heat from a boiler operating at 80% efficiency.

The calculation of avoided emission for storage devices is also more complex than for electric-only devices. Although storage devices increase total consumption of electricity, the staff proposal reasoned that storage could reduce emissions to the extent that storage devices charge during off peak times when combined cycle plants are likely to be on the margin and discharge during peak hours when less efficient simple cycle turbines are on the margin.¹⁵ The staff proposal used an emission rate of 368 kgCO₂/MWh for combined cycle plants (which generally run during off-peak hours) and 575 kgCO₂/MWh for simple cycle plants (which generally run during peak hours).¹⁶ Assuming an annual degradation in round-trip efficiency, staff determined that the minimum initial round-trip for a storage device to reduce GHGs is 67.9%.¹⁷ This minimum round-trip efficiency assumed a constant line loss factor of 7.8%. The minimum

¹³ The current version of the SGIP Handbook can be found at http://www.cpuc.ca.gov/PUC/energy/DistGen/sgip/.

¹⁴ 2015 SGIP Handbook v1 at 50.

¹⁵ Staff Proposal, Appendix A at 57.

¹⁶ Staff Proposal, Appendix A at 60.

¹⁷ Staff Proposal, Appendix A at 60 - 61.

round trip efficiency was subsequently modified to 63.5% in Resolution E-4519 (issued September 13, 2012) based on evidence submitted by California Energy Storage Alliance (CESA) that line losses are higher during peak hours than during off-peak hours.¹⁸

3. **Questions for Parties**

Parties are requested to respond to the questions below. Please refer to the question numbers in your responses and provide sufficient detail to fully explain the assumptions, data sources and methodologies used to calculate your proposed emission factors or round-trip efficiencies. Include citations to any data sources used.

- 1. Should the updated SGIP GHG eligibility factor(s) use a short run methodology, a long run methodology, or a combination of the two? Why?
- 2. Section 379.6(b)(2) directs the Commission to update the factor "based on the most recent data available to the State Air Resources Board for GHG emissions from electricity sales in the self-generation incentive program administrators' service areas..." Based on your response to Question 1, exactly what data sources from ARB should be used and how should they be applied to derive the short run and/or long run-based factors?
- 3. The emission factor adopted in D.11-09-015 assumes that SGIP technologies will avoid the need for new renewable generation in proportion to the 20% RPS goal in effect during the time the staff developed its proposals. Section 379.6(b)(2) also directs the Commission to include "consideration of the effects of the California Renewables Portfolio Standard." How should this be accomplished?

¹⁸ http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M027/K831/27831617.PDF.

- 4. For factors based on long run effects, what combination of technologies, and in what proportions, should SGIP projects be assumed to displace?
- 5. D.11-09-015 states that SGIP-funded technologies should avoid GHG emissions through at least the first ten years of operation, taking into account system degradation.¹⁹ Should that time frame be revised, and if so, why? Should the time frame be the same for all technologies? If not, what time frames should apply to which technologies and why? How does your proposal comply with the requirement in § 379(b)(2) that the methodology account for "estimates of greenhouse gas emissions over the useful life of the distributed energy resource"?
- 6. Should the 1% per year assumption for performance degradation be revised for one or more SGIP-eligible technologies, and if so, using what data sources?
- 7. Should the 7.8% line loss factor adjustment to the GHG factor be revised? Explain why or why not. If so, using what data? Should the factor vary by utility service territory, other geographic delineations, or generation profiles of different SGIP technologies? Explain why or why not.
- 8. For SGIP-eligible CHP projects, should the 80% boiler efficiency factor be updated and if so, using what data? Should it vary based on the capacity of the SGIP project or the size of the thermal load? Since exports from technologies not subject to net energy metering do not reduce the utilities' metered load, and thus do not reduce the utilities' obligation to supply RPS-eligible generation, should estimate exports from CHP (or other technologies not subject to net energy metering) be subject to a different emission rate based only on other fossil-fired sources of generation? Explain why or why not.

¹⁹ D.11-09-015 at 15.

- 9. Please answer the following questions related to determining the minimum round-trip efficiency for SGIP-eligible storage technologies. In light of the ongoing transformation in the resources serving California's load, is the assumption that combined cycle plants are marginal during off-peak hours and simple cycle plants are marginal during peak hours still valid? Why or why not? If not, what mix of resources should the emission factor assume are on the margin and what data sources should be used? Be explicit regarding whether the effect is long-run, short run, or a combination of the two. Would production cost modeling results be useful (e.g., testimony submitted in R.12-06-013) for the avoided GHG emission calculations for storage? To the extent your proposed methodology assumes that storage affects natural gas-fired generation, should the emission factor for combined cycle and simple cycle power plants be updated, and if so, using what data? Should the line loss factors of 5.3% for off-peak and 10.3% for on peak adopted in Resolution E-4519 be updated, and if so, using what data?
- 10. Please describe the methodology, assumptions, data sources and resulting emission factors (or round-trip efficiencies) that should be used to determine SGIP eligibility for electric-only, CHP, and storage technologies.

IT IS RULED that parties may file opening comments on the questions herein on or before April 17, 2015. Reply comments are due on or before April 23, 2015.

Dated March 27, 2015, at San Francisco, California.

/s/ MICHAEL PICKER

Michael Picker

Assigned Commissioner